REMARKS

This is in response to the Office Action dated November 25, 2002. Claims 9 and 18 have been canceled. Claims 1, 2, 4-7, 10-11, 13-16, 19 and 23-27 are pending. Attached hereto is a marked-up version of the changes made to the claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made.**"

A. Section 112/132 "New Matter" Rejections

The disclosure stands objected to under 35 U.S.C. Section 132, and claims 1, 10 and 23 stand rejected under 35 U.S.C. Section 112, first paragraph. In this regard, the Office Action contends that the subject matter added to claim 1 in the Amendment of July 24, 2001 (i.e., "***only*** a first insulating protective film for insulating and covering the metal wiring pattern and the through hole on the metal-wiring-pattern side . . . ***no*** insulating protective film other than said first insulating protective film covers the metal wiring pattern and the through hole on the metal wiring pattern side") represents "new matter" and is not supported by the application as originally filed. While applicant does not agree with this rejection, the claims have been amended herein to address this rejection and render it moot.

With respect to claims 1, 10 and 23, the Office Action contends that the "only" language represents "new matter" because Fig. 1(b) as filed illustrates resin 34 in a position which the Office Action contends is "proximate" the through hole (see the Office Action at page 3, lines 4-6). While applicant does not agree with this rejection, claims 1, 10 and 23 have been amended herein to address it and render the rejection moot. In

particular, the claims have been amended to state that no *solder resist* film other than the first solder resist insulating protective film (30) insulates and/or covers the metal wiring pattern (28) proximate the through hole. Resin 34 in Fig. 1(b) is not a solder resist film. Instead, resin 34 is a hard epoxy resin used to prevent warping. Resin 34 is intentionally located far from (not proximate) the through hole, because if it were located proximate the through hole its hardness would prevent bending which is a main reason why the through hole is provided. To summarize, resin 34 is not a solder resist, and is located far from the through hole. Regardless of whether or not the Examiner considers resin 34 to be "proximate" the through hole, the fact that it is not a solder resist overcomes the Section 112, 132 rejection in view of amendments to claims 1 and 10 herein.

Thus, with respect to claims 1, 10 and 23, it is now irrelevant whether or not resin 34 is "proximate" the through hole as alleged in the Office Action. Clearly, Fig. 1(b) as originally filed does not illustrate any "solder resist" film other than film 30 proximate the through hole on the metal wiring pattern side thereof (resin 34 is not a solder resist). In addition, the instant specification explains at page 41, lines 19+, that "since the formation of the solder resist is made *only once*, the number of days in manufacturing the tape carrier 23 can be shortened by one day, as compared with the case in which the formation of solder resist is carried out twice. . . " (emphasis added). This emphasizes that resin 34 is not a solder resist. In this respect, in addition to the drawings as filed, the text of the application as filed also emphasizes the advantage of providing only one protective solder resist film over lead 28 on the metal wiring pattern side. The application as filed clearly supports this aspect of amended claims 1, 10 and 23.

B. Examiner's Request for information per 37 CFR Section 1.105

On pages 20-22 of the Office Action, the Examiner makes a request pursuant to 37 C.F.R. Section 1.105 for information relating to the alleged APA from page 12, antepenultimate line, to page 14, line 8 of the instant application. In this respect, the undersigned has been informed that to date, the applicant has not found any "publication" regarding the content of the prior art described in the specification from page 12, third line from the bottom, to page 14, line 8.

However, in response to the Examiner's request, applicant notes that the Japanese application corresponding to JP 2509509 (Tokukaihei 6-283575) was referred to in preparing the present application/invention. This reference (JP 2509509) has already been filed with the USPTO, via an IDS dated September 28, 1998 (corrected Feb. 11, 1999). The publication describes application of an over-coating agent, which repels sealing resin. This application of the over-coating agent prevents the sealing resin on the chip from bleeding from the chip periphery to the outside of the chip. If a complete translation is desired by the Examiner, he should refer to counterpart U.S. Patent No. 5,477,080 (copy enclosed).

Furthermore, a search was conducted prior to filing the instant application. The search turned up JP 2509509. The search was made in Japan, and was conducted on an in-house patent gazette searching system "STAGE" of assignee Sharp Kabushiki Kaisha. All relevant art (i.e., JP 2509509) uncovered in the search has previously been submitted to the USPTO in this case via IDS.

C. Art Rejections

Claims 1, 2, 4, 6-11, 13, 15, 16-19, and 23-27 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over admitted prior art (APA) and Miyamura. This §103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires that "the first and second solder resist insulating protective films comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and wherein on the metal-wiring-pattern side of the insulating tape no solder resist insulating protective film other than said first solder resist insulating protective film covers the metal wiring pattern proximate the through hole, and wherein the solder resist of the first insulating protective film includes a filler in the range of 10 wt% to 40 wt% that determines viscosity thereof." For example and without limitation, see Fig. 1(b) of the instant application, where the only solder resist film covering the wiring pattern 28 on the metal-wiring-pattern side of the tape is solder resist film 30 (resin 34 is not a solder resist film). No other protective solder resist film is provided over wiring pattern 28 near through hole 25. The cited art fails to disclose or suggest this aspect of claim 1, whether taken alone or in the alleged combination.

In direct contrast to the inventions of claim 1, APA Figure 7 utilizes two solder resist films 110 and 111 to cover the wiring pattern proximate through hole 105. Thus, claim 1 cannot possibly be met by Figure 7. APA Figure 7 teaches directly away from the invention of claim 1 by requiring two separate solder resist films. Moreover, the structure of APA Figure 7 is problematic because solder resist 110 is very hard (young's modulus of 380 kgf/mm^2); thus rendering APA Fig. 7 inferior to the invention of claim 1 (i.e., resist 110 has a young's modulus much higher than the range required by claim 1).

The problems with this are discussed at length in the instant specification. Citation to additional art cannot overcome the fundamental flaws associated with APA Figure 7.

Miyamura also fails to disclose or suggest the aforesaid aspect of claim 1. Thus, even if these two references were combined, the invention of claim 1 still would not be met. The rejection should be withdrawn.

Independent claim 10 requires "the first and second insulating protective films comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and wherein on the metal-wiring-pattern side of the insulating tape no solder resist film other than the first solder resist insulating protective film insulates and covers the metal wiring pattern proximate the through hole, and the solder resist of the first insulating protective film includes a filler in the range of 10 wt% to 40 wt% that determines viscosity thereof." As explained above, neither the APA nor Miyamura disclose or suggest this aspect of claim 10. Even the alleged combination of the APA and Miyamura cannot meet this aspect of claim 10.

Claim 23 also requires that on the metal-wiring-pattern side of the insulating tape no insulating *solder resist* other than said first insulating solder resist protective film covers the metal wiring pattern near the through hole. Resin 34 in APA Fig. 7 is irrelevant because it is not a solder resist. As explained above, even the alleged combination of the APA and Miyamura cannot meet this aspect of claim 23.

Claim 24 requires that "the first and second insulating protective films comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2 so that all solder resist films proximate the through hole on both sides of the tape are

characterized by a young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and wherein the solder resist of the first insulating protective film contains a filler that determines the viscosity thereof in the range of 10 wt% to 40 wt%." The cited art fails to disclose or suggest the subject matter of claim 24.

The arrangement of APA Fig. 7(b) uses solder resist 111 having a Young's modulus of 50 +/- 20 kgf/mm^2, and another type of solder resist 110 having a Young's modulus of 380 +/- 80 kgf/mm^2 on the metal wiring pattern side of substrate 102. Using only a resist 111 having a Young's modulus of 50 +/- 20 kgf/mm^2 would result in undesirable bleeding of the solder resist, and the additional solder resist 110 having a Young's modulus of 380 +/- 80 kgf/mm^2 is used for preventing bleeding (e.g., see pg. 3 of the instant application). Omitting the solder resist 110 having a Young's modulus of 380 +/- 80 kgf/mm^2 from the arrangement of Fig. 7(b) would thus lead to undesirable bleeding. Therefore, one of ordinary skill in the art would not have omitted resist 110 from the APA Fig. 7(b), because one of ordinary skill in the art would not have wanted bleeding to occur.

In contrast with APA Fig. 7(b), the invention of claim 24 requires each of: (a) the solder resist on the metal wiring pattern side of the substrate to have a Young's modulus in the range of 5 kgf/mm^2 to 70 kgf/mm^2; (b) all solder resist films proximate the through hole on both sides of the tape are characterized by a young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and (c) the solder resist of the first insulating protective film contains a filler that determines the viscosity thereof in the range of 10 wt% to 40 wt%. APA Fig. 7(b) does not disclose (a), (b) or (c). *Surprisingly*, the claimed combination of

(a), (b) and (c) as required by claim 24 enables the instant invention to prevent or reduce bleeding *without* having to provide a harder solder resist with a 380 +/- 80 kgf/mm^2 Young's modulus. See for example the instant specification at pages 28-29. Thus, because of the claimed combination of (a)-(c), the metal wiring side resist(s) can achieve practical resistance to wire breaks and can avoid/reduce bleeding without the need for a harder solder resist with a 380 +/- 80 kgf/mm^2 Young's modulus.

Miyamura merely discloses improving general characteristics of solder resist, and fails to disclose or suggest suitable amounts of filler for bleeding prevention. In contrast, the invention of claim 24 is based on the finding that when applied to a curved part of a wiring board having a slit, the solder resist under the foregoing conditions achieves good results in wire break testing and reduces development of bleeding (e.g., see page 35, line 18, through page 36, line 10, of the instant specification).

Accordingly, it would not have been obvious to have combined Miyamura and the APA as alleged in the Office Action. Claims 25-27 define over the cited art in a similar manner as that discussed above with respect to claim 24.

Claims 1, 2, 4, 6-11, 13, 15, 16-19, and 23 also stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over the APA and Miyamura, and further in view of Tajima. See pages 16-19 of the Office Action. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

APA Fig. 7 utilizes two different resist films 110 and 111 proximate through hole 105. The APA Figure 7 structure is problematic because film 110 is very hard and has a Young's modulus of 380 kgf/mm^2. In other words, film 110 has a Young's modulus

much higher than that required by claim 1. The APA teaches, on page 3 of the instant application, that this high modulus enables film 110 to play "two roles for preventing the occurrence of bleed." Thus, APA Figure 7 desires and requires a film 110 with such a high Young's modulus; thereby teaching away from the instant claimed invention. In contrast, the instant specification explains in detail why the Young's modulus range required by claim 1 is advantageous over the prior art. *Unexpected results* are associated with the claimed Young's modulus.

Tajima illustrates a single "flexible" dry film resist 6 or 7 provided over conductive pattern 4 proximate a slit 2 in underlying film 1. However, Tajima fails to disclose any particular Young's modulus for the resist film. Even if the resist 6 or 7 of Tajima were to be used in APA Fig. 7 (which applicant believes would be incorrect in any event), the claimed Young's modulus in claim 1 would still not be met, nor would the advantageous results associated therewith. Thus, even citing Tajima, the prior art still fails to disclose or suggest the inventions of claim 1, wherein only a single solder resist protective film covers the metal wiring pattern on the metal wiring pattern side of the tape proximate the through hole, where that solder resist protective film has a Young's modulus from 5-70 kgf/mm^2. Furthermore, the claimed filler range is also not disclosed or suggested.

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (*Amended*) A tape carrier package semiconductor device, which includes a tape carrier and semiconductor elements that have been packaged on the tape carrier, said tape carrier package semiconductor device comprising:

an insulating tape,

a metal wiring pattern installed on one surface of the insulating tape, the metal wiring pattern being provided on a metal-wiring-pattern side of the insulating tape,

a through hole that is provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

on the metal-wiring-pattern side of the insulating tape, [only]a first solder resist insulating protective film for insulating and covering the metal wiring pattern and the through hole at locations over and proximate the through hole[, so that no other insulating film is located on the metal-wiring-pattern side of the insulating tape proximate the through hole],

on a side of the insulating tape opposite the metal-wiring-pattern side, a second solder resist insulating protective film for insulating and covering the through hole, and

resin sealing peripheral portions where the metal wiring pattern and a semiconductor element are connected;

wherein the first and second solder resist insulating protective films comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and

wherein on the metal-wiring-pattern side of the insulating tape no solder resist insulating protective film other than said first solder resist insulating protective film covers the metal wiring pattern proximate the through hole, and wherein the solder resist of the first insulating protective film includes a filler in the range of 10 wt% to 40 wt% that determines viscosity thereof.

10. (*Amended*) A liquid crystal panel display, which is provided with a liquid crystal panel and a tape carrier package semiconductor device having a tape carrier and semiconductor elements that have been packaged on the tape carrier so as to drive the liquid crystal panel, wherein said tape carrier comprises:

an insulating tape,

a metal wiring pattern installed on one surface of the insulating tape, the metal wiring pattern being provided on a metal-wiring-pattern side of the insulating tape,

a through hole that is provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

on the metal-wiring-pattern side of the insulating tape, [only]a first solder resist insulating protective film for insulating and covering the metal wiring pattern and the through hole at locations over and proximate the through hole,

on a side of the insulating tape opposite the metal-wiring-pattern side, a second solder resist insulating protective film for insulating and covering the through hole, and

resin for sealing periphery portions at which the semiconductor device and the metal wiring pattern are connected,

wherein the first and second solder resist insulating protective films [are made of]comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and wherein on the metal-wiring-pattern side of the insulating tape no solder resist film other than [only]the first solder resist insulating protective film insulates and covers the metal wiring pattern proximate the through hole, and the solder resist of the first solder resist insulating protective film includes a filler in the range of 10 wt% to 40 wt% that determines viscosity thereof.

23. (*Amended*) A tape carrier package semiconductor device comprising:

an insulating tape,

a metal wiring pattern on one surface of the insulating tape, the metal wiring pattern being provided on a metal-wiring-pattern side of the insulating tape

a through hole provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

on the metal-wiring-pattern side of the insulating tape, [only]a first [insulating] solder resist insulating protective film for insulating and covering the metal wiring pattern and the through hole, and

on a side of the insulating tape opposite the metal-wiring-pattern side, a second [insulating]solder resist insulating protective film for insulating and covering the through hole,

wherein the first and second [insulating]solder resist insulating protective films [are made of]comprise the same material of solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and on the metal-wiring-pattern side of the insulating tape no insulating solder resist other than said first [insulating]solder resist insulating protective film covers the metal wiring pattern near the through hole, and

wherein the solder resist of the first solder resist insulating protective film includes a filler in the range of 10 wt% to 40 wt% that determines viscosity thereof.

24. (*Amended*) A tape carrier package semiconductor device, which has a tape carrier and semiconductor elements that have been packaged on the tape carrier, characterized in that said tape carrier comprises:

an insulating tape,

a metal wiring pattern installed on one surface of the insulating tape,

a through hole that is provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

a first insulating protective film for insulating and covering the metal wiring pattern and the through hole on a metal-wiring-pattern side of the insulating tape,

a second insulating protective film for insulating and covering the through hole on the side opposite to the metal-wiring-pattern side,

wherein the first and second insulating protective films [are made of]comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2 so that all solder resist films proximate the through hole on both sides of the insulating tape are characterized by a young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and

wherein the solder resist of the first insulating protective film contains a filler that determines the viscosity thereof in the range of 10 wt% to 40 wt%.

25. (*Amended*) A liquid crystal panel display, which is provided with a liquid crystal panel and a tape carrier package semiconductor device having a tape carrier and semiconductor elements that have been packaged on the tape carrier so as to drive the liquid crystal panel, characterized in that said tape carrier comprises:

an insulating tape,

a metal wiring pattern installed on one surface of the insulating tape,

a through hole that is provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

a first insulating protective film for insulating and covering the metal wiring pattern and the through hole on a metal-wiring-pattern side of the insulating tape,

a second insulating protective film for insulating and covering the through hole on the side opposite to the metal-wiring-pattern side,

wherein the first and second insulating protective films [are made of]comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2 so that

all solder resist films proximate the through hole on both sides of the insulating tape are characterized by a young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and

wherein the solder resist of the first insulating protective film contains a filler that determines the viscosity thereof in the range of 10 wt% to 40 wt%.

26. (*Amended*) A tape carrier package semiconductor device, which has a tape carrier and semiconductor elements that have been packaged on the tape carrier, characterized in that said tape carrier comprises:

an insulating tape,

a metal wiring pattern installed on one surface of the insulating tape,

a through hole that is provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

a first insulating protective film for insulating and covering the metal wiring pattern and the through hole on a metal-wiring-pattern side of the insulating tape,

a second insulating protective film for insulating and covering the through hole on the side opposite to the metal-wiring-pattern side,

wherein the first and second insulating protective films [are made of]comprise solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2 so that all solder resist films proximate the through hole on both sides of the insulating tape are characterized by a young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and

wherein the first insulating protective film [is made of]comprises solder resist of one kind, and the solder resist contains a filler which determines viscosity thereof in a range of 10 wt% to 40 wt%.

27. (*Amended*) A liquid crystal panel display, which is provided with a liquid crystal panel and a tape carrier package semiconductor device having a tape carrier and semiconductor elements that have been packaged on the tape carrier so as to drive the liquid crystal panel, characterized in that said tape carrier comprises:

an insulating tape,

a metal wiring pattern installed on one surface of the insulating tape,

a through hole that is provided in a manner so as to penetrate the insulating tape so that the insulating tape is allowed to bend,

a first insulating protective film for insulating and covering the metal wiring pattern and the through hole on a metal-wiring-pattern side of the insulating tape,

a second insulating protective film for insulating and covering the through hole on the side opposite to the metal-wiring-pattern side,

wherein the first and second insulating protective films are made of solder resist whose young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2 so that all solder resist films proximate the through hole on both sides of the insulating tape are characterized by a young's modulus is in the range of 5 kgf/mm^2 to 70 kgf/mm^2, and

wherein the first insulating protective film is made of only one kind of solder resist and contains a filler that determines viscosity thereof in the range of 10 wt% to 40 wt%.